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Home versus center based physical activity programs in older adults (Review)

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[Intervention Review]

Home versus center based physical activity programs in older adults

Nigel L Ashworth[1], Karen E Chad[2], Elizabeth L Harrison[3], Bruce A Reeder[4], Shawn C Marshall[5]

[1]Physical Medicine & Rehabilitation, University of Alberta, Edmonton, Canada. [2]College of Kinesiology, University of Saskatchewan, Saskatoon, Canada. [3]School of Physical Therapy, University of Saskatchewan, Saskatoon, Canada. [4]Community Health & Epidemiology, University of Saskatchewan, Saskatoon, Canada. [5]Physical Medicine & Rehabilitation, University of Ottawa, Ottawa, Canada

Contact address: Nigel L Ashworth, Physical Medicine & Rehabilitation, University of Alberta, Glenrose Rehabilitation Hospital, 10230-111 Avenue, Edmonton, Alberta, T5G 0B7, Canada. ashworth@cha.ab.ca.

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ABSTRACT

Background

Physical inactivity is a leading cause of preventable death and morbidity in developed countries. In addition physical activity can potentially be an effective treatment for various medical conditions (e.g. cardiovascular disease, osteoarthritis). Many types of physical activity programs exist ranging from simple home exercise programs to intense highly supervised hospital (center) based programs.

Objectives

To assess the effectiveness of 'home based' versus 'center based' physical activity programs on the health of older adults.

Search methods

The reviewers searched the Cochrane Central Register of Controlled Trials (CENTRAL) (1991-present), MEDLINE (1966-Sept 2002), EMBASE (1988 to Sept 2002), CINAHL (1982-Sept 2002), Health Star (1975-Sept 2002), Dissertation Abstracts (1980 to Sept 2002), Sport Discus (1975-Sept 2002) and Science Citation Index (1975-Sept 2002), reference lists of relevant articles and contacted principal authors where possible.

Selection criteria

Randomised or quasi-randomised controlled trials of different physical activity interventions in older adults (50 years or older) comparing a 'home based' to a 'center based' exercise program. Study participants had to have either a recognised cardiovascular risk factor, or existing cardiovascular disease, or chronic obstructive airways disease (COPD) or osteoarthritis. Cardiac and post-operative programs within one year of the event were excluded.

Data collection and analysis

Three reviewers selected and appraised the identified studies independently. Data from studies that then met the inclusion/exclusion criteria were extracted by two additional reviewers.

Main results

Six trials including 224 participants who received a 'home based' exercise program and 148 who received a 'center based' exercise program were included in this review. Five studies were of medium quality and one poor. A meta-analysis was not undertaken given the heterogeneity of these studies.

Cardiovascular
The largest trial (accounting for approximately 60% of the participants) looked at sedentary older adults. Three trials looked at patients with peripheral vascular disease (intermittent claudication). In patients with peripheral vascular disease center based programs were superior

to home at improving distance walked and time to claudication pain at up to 6 months. However the risk of a training effect may be high. There are no longer term studies in this population.

Notably home based programs appeared to have a significantly higher adherence rate than center based programs. However this was based primarily on the one study (with the highest quality rating of the studies found) of sedentary older adults. This showed an adherence rate of 68% in the home based program at two year follow-up compared with a 36% adherence in the center based group. There was essentially no difference in terms of treadmill performance or cardiovascular risk factors between groups.

Chronic Obstructive Pulmonary Disease (COPD)
Two trials looked at older adults with COPD. In patients with COPD the evidence is conflicting. One study showed similar changes in various physiological measures at 3 months that persisted in the home based group up to 18 months but not in the center based group. The other study showed significantly better improvements in physiological measures in the center based group after 8 weeks but again the possibility of a training effect is high.

Osteoarthritis
No studies were found.

None of the studies dealt with measures of cost, or health service utilization.

Authors' conclusions

In the short-term, center based programs are superior to home based programs in patients with PVD. There is a high possibility of a training effect however as the center based groups were trained primarily on treadmills (and the home based were not) and the outcome measures were treadmill based. There is conflicting evidence which is better in patients with COPD. Home based programs appear to be superior to center based programs in terms of the adherence to exercise (especially in the long-term)

PLAIN LANGUAGE SUMMARY

Physical activity programs for older adults

To improve health, is it better to do an exercise programme at home or at a hospital center?
To answer this question scientists from the Cochrane Group found and analyzed 6 studies. These studies tested over 370 people over 50 years old who had heart disease (or high risk of heart disease), Chronic Obstructive Airways Disease (COPD). The studies compared people who did an exercise programme at home to those who did an exercise programme at a hospital or center up to 2 years. This review provides the best evidence we have today.

What is the difference between exercise programmes at home or at a center? Why research whether one is better than the other?
Active living benefits the health of people 50 years and older. One of the important benefits is being able to do your everyday activities better and walking better (physical function). There are many ways to increase activity. You can do an exercise programme at home on your own, at your own convenience and at maybe a cost to you, but no cost to the health care system. Or you can join a programme at a center or hospital run by trained health care professionals. Most times these programmes are covered and do not cost you anything but they do cost the health care system. It is therefore important to know which type of programme improves health more, which programme people will stick with in the long run and which programme is worth the cost.

Which type of programme was better in the studies?
In people who had heart disease or an increased risk of heart disease
After 6 months, most studies show that exercise programmes, whether at home or at a center improve physical function, quality of life, blood cholesterol levels, walking speed and leg pain after walking due to poor blood flow. When comparing the two exercise programmes, the studies found that improvements were similar but that exercising at a center may improve walking speed and leg pain after walking more than at home.

One large study shows that many more people tend to stick with exercising after a home based programme compared with a center programme in the long-term.

In people who had COPD
Most studies show that exercise programmes, whether at home or at a center, improve physical function, decrease blood pressure, and improve some tests for exercise. But quality of life and other tests for exercise did not improve. When comparing the two exercise programmes, one study shows that improvements at home were similar to a center at 3 months. But at 18 months exercising at home was better than at a center. Another study shows that exercising at a center was better than at home at 2 months but the same at 13 months.

No studies looked at costs or use of the health care system.

Were there any problems with the programmes?
This review did not report any problems with the programmes.

What is the bottom line?

There is 'silver-level' evidence (www.cochranemsk.org) that both exercising at home or at a center improves the health and physical function of older adults. But, people tend to stick with exercising at home more than in a center.

People with heart disease or a high risk of heart disease may show more improvements exercising at a center than at home in the short-term (3 months). In people with COPD, it is still not clear whether exercising at home or at a center is better.

More research is still needed to test which type of programme might be better for people with osteoarthritis and what the costs are in general.

BACKGROUND

Physical inactivity is a leading cause of preventable death in developed countries. In North America it has been estimated that the cost of unhealthy conditions predisposed by physical inactivity is close to a trillion dollars per year (Booth 2000). The Global Burden of Disease Study estimates that in Established Market Economies, 5% of Disability Adjusted Life Years (DALY) are lost due to physical inactivity and that in Formerly Socialist Economies of Europe ,3% are lost (Murray 1996). The National Institute of Public Health in Stockholm estimates that 1.4% of DALYs lost in the EU are due to physical inactivity (NIPH 1997).

Today it is recognized that a physically active lifestyle contributes to the health and economic aims of citizens and the government. In 1994 the Heart and Stroke Foundation of Canada recognized physical inactivity as a fourth major risk factor for coronary artery disease along with smoking, dyslipidemia and hypertension. Similar conclusions have been made in other developed countries (EHN 1999). Since then the U.S. Centers for Disease Control and Prevention, the American College of Sports Medicine, the U.S. National Institute of Health and the U.S. Surgeon General have recognized the importance of physical activity in reducing the risk for chronic degenerative diseases (USDHHS 1996). In addition, Health Canada (Health Canada 1999) identified that a physically active lifestyle improved fitness, quality of life, physical and mental health, energy, muscle and bone strength, posture and balance, prolonged independent living in later years, psychological well-being, social integration, spiritual benefits and reduced stress. In the United Kingdom the Physical Activity Task Force (PATF 1995) identified that "if half those people taking some moderate activity [in the UK] increased it to moderate activity at least five times a week there would be a 7% reduction in deaths from Coronary Heart Disease" (CHD).

Physical activity is considered to be a "gateway" or a point of entry into making changes in other factors apart from lifestyle-related ones. For example, physical activity is believed to enhance such social attributes as leadership, cooperation, respect for rules and laws, sportsmanship, self-control, achievement, a collective orientation, and a negative attitude towards racism (Stevenson 1972). In addition, involvement in physical activity has also been shown to play a role in social mobility. Accordingly, it is seen by some as a "pipeline" out of the "wrong side of the tracks" for those in adverse social environments (Leonard 1998).

Physical inactivity has an impact on health care costs. Active individuals use health-care services to a lesser extent than sedentary individuals (NPHS 1997). The Conference Board of Canada (CBC 1996) has estimated that each 1% increase in the number of individuals who are physically active would reduce treatment costs for ischemic heart disease by over $10 million annually. Other studies have found that the estimated per-capita annual impact of physical inactivity amounted to $172 (Goetzel 1998) in an employed population, and that an additional day of physical activity (above zero) yielded a 5% reduction in median health care charges (Pronk 1999). In addition, Booth et al (Booth 2000) estimated that the total cost of 17 unhealthy conditions predisposed by physical inactivity is close to a trillion dollars per year. Further, concern has been raised in many sectors of the community that in the years ahead the aging baby boomer generation will place a heavy burden on the health-care system. Physical activity may be one of the easiest and most effective ways to reduce health-care costs in developed countries.

It has been suggested in the literature that including physical activity as a preventative health measure at all levels in the health care continuum may effectively promote healthy aging. The limiting effects of age-related disease or disabilities may be overridden or suppressed by active living, even though the impairment is not eliminated. Increased functional demand, obtained through regular physical activity, produces physiological adaptive and self-regulating mechanisms which increase performance and functional capacity. These outcomes, in turn, may evoke feelings of well-being and self-efficacy, and reduce the burden of a substantial period of dependent living (Katz 1983).

Although the benefits of active living among those 50 years and older are widely accepted, there has not been to date a systematic review of the world literature to determine what types of physical activity programs are the most effective in this population. Many types of physical activity programs exist ranging from simple home exercise programs to intense highly supervised hospital based programs. Which of these programs provides the most health improvements? Which exercise programs are the most cost-effective? Should programs be home based or center based? What are the long-term outcomes related to these interventions? Which type of program is most likely to lead to long-term maintenance of physical activity? These are some of the unanswered questions we hope to answer in this systematic review.

OBJECTIVES

To assess the effectiveness of 'home based' versus 'center based' physical activity programs on the health of older adults who have one or more of the following:
1. Existing cardiovascular disease.
2. One or more risk factors for cardiovascular disease.
3. Chronic obstructive pulmonary disease (COPD).
4. Degenerative arthritis.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised or quasi-randomised controlled trials of different physical activity interventions in older adults that fulfilled the inclusion criteria

Types of participants

All the studies included adult participants who were at least 50 years of age or older AND who had one or more of the following:
1. One or more risk factors for cardiovascular disease (e.g. diabetes, hypertension, overweight, obesity, hypercholesterolemia, family history, smoking, physically inactive)
2. Existing cardiovascular disease
a) Hypertensive disease
b) Ischemic heart disease
c) Diseases of the pulmonary circulation
d) Other heart disease
e) Cerebrovascular disease
f) Diseases of arteries, arterioles and capillaries

3. Existing Chronic Obstructive Pulmonary Disease (COPD) and allied conditions plus pneumoconiosis and other lung diseases due to external agents
4. Existing osteoarthritis

Two reviewers (NA and BR) reviewed any included studies as to the acceptability of the diagnostic criteria used for the above conditions. In case of disagreement a neutral local expert in the area was asked for his/her opinion on whether appropriate diagnostic criteria were used. We recognise that in most cases no strong consensus existed for diagnosing many of the above conditions.

Studies of individuals who had a recent (within one year) cardiovascular event (myocardial infarction, stroke etc) were excluded. Studies of post-operative physical activity programs were also excluded. Studies of 'chronic pain' populations (e.g. 'mechanical low back or neck pain', fibromyalgia etc.) were excluded. In studies where there was overlap between the population above and a wider population we attempted to contact the authors to obtain individual patient data covering our population of interest, otherwise the trial was excluded.

Types of interventions

All studies had at least one treatment arm that involves a program of 'home based' physical activity and another that involved a program of 'center based' physical activity. We defined physical activity as any body movement produced by skeletal muscle that results in a substantial increase in energy expenditure. Exercise is a form of physical activity that is performed on a repeated basis for an extended period of time (Bouchard 1994).

There are many types of physical activity programs that represent a wide continuum of potential interventions. At one extreme is the 'home based' program that is defined as physical activity that takes place in an informal, flexible setting typically in an individuals' home. Often this type of program is self initiated and does not require any medical clearance. There is little or no contact with health care professionals and little or no ongoing evaluation or progression of activity. As a result home based physical activity programs often receive no funding from district health boards or the 'traditional health care system' as the individual covers any costs associated with the program.

Center based physical activity programs are essentially the other extreme. They are formal, less flexible programs that run for defined periods of time at a health care facility. Medical clearance and health care professional referrals are a prerequisite and often specific inclusion and exclusion criteria exist for participation. Supervision by trained health care professionals is frequent and regular. Programs are modified on an individual basis. These types of program are often funded through the 'traditional health care system'.

If a treatment arm contained more than one treatment (e.g. physical activity and education) then the effect of the physical activity had to be clearly discernable otherwise it was excluded. If sufficient numbers of similar (combined physical activity plus other treatments) studies existed we planned on performing a sub-group analysis, in fact none were found.

In an attempt to reduce heterogeneity we planned on categorizing the interventions based on the type, frequency, duration and intensity of the physical activity and on whether the physical activity is undertaken as a group or an individual. Again so few studies were actually found that this was simply not possible.

Types of outcome measures

Primary:
Measures of functional activity (ADLs, walking ability etc)

We chose measures of functional activity as the primary outcomes for the review because of our a priori belief that improvement in function should be the primary aim of exercise intervention. We also felt that improvements in function are of higher importance to individual participants and a more powerful motivator of continued exercise adherence (than for example changes in heart rate or arterial blood gases). Furthermore clinically significant changes at the physiological or anatomical level are unlikely to occur without consequent changes in function.

Secondary:
Long-term maintenance of physical activity (e.g. activity log book, Community healthy activities model program for seniors -CHAMPS, etc)
Measures of Quality of Life (SF36, Sickness impact profile, etc)
Cost
Health Service utilization

Secondary Cardiovascular related:
Mortality
Rates of Cardiovascular diseases
Exercise capacity
CV Risk factor reduction (blood pressure, weight, etc)

Secondary COPD related:
Mortality
Lung function tests
Exercise capacity

Secondary degenerative arthritis related:
Pain (reduction)
Joint range of motion
Radiographic deterioration

Follow-up period:
Studies will be divided into 'short-term' follow up if follow up was for 6 months or less; and 'long-term' if follow up was for greater than 6 months.

Search methods for identification of studies

ELECTRONIC SEARCHES
The following databases were searched: Cochrane Central Register of Controlled Trials (CENTRAL) (1991-Sept 2002), MEDLINE (1966-Sept 2002), EMBASE (1988 to Sept 2002), CINAHL (1982-Sept 2002), Health Star (1975-Sept 2002), Dissertation Abstracts (1980 to Sept 2002), Sport Discus (1975-Sept 2002) and Science Citation Index (1975-Sept 2002).

There was no language restrictions. Searches were limited to 'Middle aged' or 'Older' Adults (usually 45 years or older).

The following search strategy, adapted for different databases, was used:

Search for physical activity/'home'/'center' based

001 exp exertion/
002 exp sports/
003 dancing/
004 physical fitness/
005 exp "physical education and training"/
006 dance therapy/
007 exp exercise therapy/
008 exert$.mp.
009 exercis$.mp.
010 sport$.mp.
011 (walk$ or jog$ or swim$ or golf$ or bicycl$ or cycl$).mp. [mp=title, abstract, registry number word, mesh subject heading]
012 (physical adj5 (fit$ or train$ or activ$ or endur$)).mp.
013 (strength adj5 train$).mp.
014 (exercis$ adj5 (train$ or physical$ or activ$)).mp.
015 kinesiotherap$.mp.
016 aerobic$.mp.
017 (weightlift$ or weight lift$ or resistance train$).mp. [mp=title, abstract, registry number word, mesh subject heading]
018 rehabilitation/ or physical therapy/
019 (weight adj5 train$).mp.
020 or/1-19
021 limit 20 to (middle age <45 to 64 years> or "aged <65 and over>")
022 (homebas$ or home bas$).mp.
023 (hospitalbas$ or hospital bas$).mp.
024 (centerbas$ or center bas$).mp.
025 (centerbas$ or center bas$).mp.
026 (institution bas$ or institutionbas$).mp.
027 (institutional bas$ or institutionalbas$).mp.
028 supervis$.mp.
029 (community bas$ or communitybas$).mp.
030 or/22-29
031 21 and 30
032 limit 31 to (controlled clinical trial or meta-analysis or multicenter study or randomised controlled trial)
033 (random$ or single blind$).mp. [mp=title, abstract, registry number word, mesh subject heading]
034 31 and 33
035 32 or 34

036[Strategy from Cochrane handbook to search for Randomised controlled trials etc.]

Combined Physical Activity and RCT search strategies
037 036 AND 035

HANDSEARCHES
The reference list of the major textbooks, review articles and of all the included studies were handsearched in order to find other potentially eligible studies. Major journals in the field were handsearched (if not already done so by the Cochrane Collaboration).

OTHER SEARCH STRATEGIES
First authors were contacted whenever possible to ask if they know of current or unpublished studies that may meet the inclusion criteria.

Data collection and analysis

TRIALS SELECTION
The abstracts and the full article (where necessary) of potential trials retrieved from the searches were initially screened independently by three reviewers (BR, LH and SM). After reading the abstract, studies were eliminated if a majority of reviewers agreed that the trial did not meet the inclusion criteria or an exclusion factor was present. The full paper of the selected trials was then reviewed independently by three reviewers (BR, LH and SM).

EVALUATION OF TYPE OF PHYSICAL ACTIVITY PROGRAM
To our knowledge there was no accepted method that could be used to separate physical activity programs into 'home' and 'center' based. It was necessary to create a scoring system to use for the Cochrane review based on face and content validity (using local 'experts'). This method was piloted using 7 papers from the exercise literature in physiatry with the three reviewers. Each reviewer used the scoring system described below to independently rate the physical activity programs as reported in the 7 papers. In addition reviewers were asked to categorize the programs as home or center based. All the reviewers agreed on the categorization of the program as home or center based. The scoring system was designed with a range from 5 to 14). In the pilot review, the home based programs all received a score of 8 or less, the center based programs all received a score of 12 or higher.

Given the limitation of a gold standard and the results of this pilot work, it was determined that this process would be used for rating the physical activity programs for the systematic review. The scoring criteria are described below:

Place (1, 2, 3 or 4): Home-1, Meeting area not specifically designated for exercise (e.g. community center, church hall etc)-2, Gym or sports center-3, Health care institution-4
Supervision (1or 2): Little or none-1, Regular-2
Supervisors(1,2,or 3): None - 1, Non-health care professional-2, Health care professional-3
Inclusion/exclusion criteria(1,2,or 3): None-1, Some-2, Extensive-3
Referral source (1, or 2): Self-1, Health care professional-2

We expected, a priori, that most 'home based' physical exercise programs would receive less than 60% of the available marks (i.e. if all the criteria can be scored then a score of 8 or less out of a maximum of 14) and obviously 'center based' to be 60% or greater. We planned on performing a sensitivity analysis to evaluate the effect of changing this cutoff point to different values for the definition of 'home' and 'center based' but not enough studies were found.

In studies involving three or more arms consisting of different types of physical activity programs the physical activity program that appears the most 'home based' was compared with the program that appeared the most 'center based'.

QUALITY ASSESSMENT OF TRIALS
The methodological quality of all included trials was assessed using the 'criteria list for the methodological quality assessment' recommended by the Cochrane Back Review Group for Spinal Disorders (van Tulder 1997). This consists of a series of 17 questions related mainly to the internal and external validity of studies. Ten questions address internal validity specifically and we intend to use the total score from these questions to perform a cumulative meta-analysis (with papers of decreasing quality added one at a time).
Three reviewers (BR, LH and SM) performed quality assessment independently and the mean score taken. Studies were not

excluded on the basis of a poor quality score. These scores were used to categorise the papers into 'poor', 'medium' and 'high' quality (a score 1.0-3.9/10 was poor, 4.0-6.9/10 was medium and 7.0+ high).

DATA EXTRACTION
Two reviewers (NA, KC) independently extracted the data for all outcomes measures of interest which were reported within a study. Data was entered into Review Manager (RevMan 4.2.2) which ensures that the same values are entered with a double data entry system. The primary author of potentially eligible studies was contacted when necessary to resolve ambiguities in their reported methodologies or results, and to seek additional pertinent information that was not described in the published manuscript. A minority of all authors were able to be contacted.

Whenever possible for all of the continuous outcomes (i.e. exercise capacity etc.) the number of participants, the mean difference and a measure of dispersion (standard deviation (SD), standard error of the mean (SEM) or 95% confidence interval (95% CI)) was extracted for each group in the study. Standard errors of the mean and 95% confidence intervals were transformed into standard deviations before being entered into RevMan. For dichotomous variables (i.e. mortality) the number of participants and the number of events was extracted for each group in the study. Other details of the included trials such as participant characteristics (age, sex, health status etc.), the study setting, the source of funding of the study, statistical power, the number of people not agreeing to enter the study and the amount of drop outs in each group was also extracted when possible.

When the data to be extracted was not available in the article we attempted to contact the authors. If post-intervention measures of dispersion (SD, SEM or 95% CI) were not available (i.e. when post-intervention information was expressed as a percent change from baseline values) the measure of dispersion at baseline was used as the post-intervention value. This extrapolation was only performed if other pre and post measures of dispersion were similar for the same outcomes in other trials.

DATA ANALYSIS
We planned, if data was available, sufficiently similar and of sufficient quality, on performing a meta-analysis using the RevMan software. In fact the data was too heterogeneous in most cases except for adherence outcomes for sedentary adults to do this. We also planned on analysing patient groups consisting of cardiovascular disease (or risk factors), COPD and osteoarthritis separately due to the high likelihood of heterogeneity between these groups and likely different responses to activity intervention. Again this was not possible due to low numbers of trials found.

For continuous outcomes, weighted mean differences (WMD) between the post-intervention values, or the difference between baseline values and post-intervention values, of the intervention and control groups was used to analyse the size of the effects of the interventions. When results for some continuous outcomes were presented on different scales, we used the standardised mean differences (SMD). For example, changes in body mass was one of our secondary outcomes (cardiovascular risk factor reduction), and some studies reported changes in body mass in kilograms (kg), whereas others reported it in terms of body mass index (BMI= body mass (kg) per body surface area (m^2) (taking into account height)). Since height is not expected to change in adult populations it was assumed that changes in BMI simply reflected changes in body mass. The effect sizes for dichotomous data was expressed in terms of relative risk. When the information was provided in the article, we used an intention-to-treat analysis.

Given the high heterogeneity of physical activity participants all data was analysed with a random effects model. Heterogeneity between trial results was tested for using a standard chi-squared test. Tests of heterogeneity are used for examining whether the observed variation in study results is compatible with the variation expected by chance alone. A significance level of alpha = 0.1 was used for the test of heterogeneity in view of the low power of such tests. If heterogeneity is found, we attempted to determine potential sources of heterogeneity with various subgroup and sensitivity analysis (this was not necessary).

We planned on using a Funnel Plot technique to try to detect any publication bias, but again this was not possible.

SUBGROUP ANALYSES
None were performed due to low numbers of studies found

SENSITIVITY ANALYSES
None were performed as no analysis was performed

RESULTS

Description of studies

The search strategy initially produced a total of 1768 potential papers. We easily identified 899 papers that were duplicates, 36 papers that dealt with age groups under 50 years of age (mostly pediatric or adolescent), 253 papers dealing with diagnostic groups that were clearly not part of this Cochrane review (for example, fibromyalgia, cancer, depression, osteoporosis and so on), and 90 papers that were not randomised controlled trials (mostly case reports and reviews). Of the remaining 490 papers, 388 were excluded because they did not compare one exercise regimen with another exercise regimen (i.e. the trials compared exercise with another non-exercise treatment or a control). This left a total of 102 papers for more detailed review.

Of the final 102 studies, 79 were further excluded because they did not compare home based versus center based exercise regimens (see table of excluded studies) . Eight studies dealt with cardiac rehabilitation programs within one year of the myocardial event (a specific exclusion criteria of this review). Three more papers were found to include substantial numbers of subjects younger than 50 years (Cox 2001,Callaghan 1995,Perri 1997), two were found to include only 'healthy' older subjects (Brown 2000,King 2002) and one paper (Puente-Maestu 2000) appeared to be an earlier version of a later published trial (P-Maestu 2000 (II)), which was already included. One final paper (Swerts 1990) was excluded because of doubts about the internal validity of the study due to uncertainty about the randomisation method (there were large baseline differences between groups in one of the main study outcomes), and removal of certain patient data from the analysis post hoc (that removed this baseline difference). Eight papers satisfied our inclusion/exclusion criteria for the review (see table of included studies). One of the eight papers, King 1995 (King 1995) was a longer term follow-up of an earlier study (King 1991), and one study (P-Maestu 2003) appeared to be a longer term follow-up of

the earlier (P-Maestu 2000 (II)) paper. This meant that we evaluated the results of a total of six clinical trials.

The six eligible trials included 224 participants who received a 'home based' exercise program and 148 who received a 'center based' exercise program.

We assessed each exercise program in terms of the scale we developed to try to quantify 'home' and 'center' based characteristics. All but one home based exercise program received a score of 8 or less (range 6.5-10) and all center based programs received a score of 10 or higher (range 10-14). In one study (Strijbos 1996) the home based program consisted of frequent and direct supervision by a qualified physiotherapist, home-care nurse and general practitioner and was scored at 10. The corresponding center based program was scored at 14 hence we continued to analyze the two programs as 'home versus center' as we had decided to do a priori (see 'Evaluation of type of physical activity program'). No meta-analysis was performed and we therefore did not perform a sensitivity analysis using a different cut-off value for the scale. Of note the final two questions of the scale (i.e. Inclusion/exclusion criteria: None-1, some-2, extensive-3 and Referral source: Self-1, health care professional-2) did not discriminate the home versus center based programs. Home and center based programs were given the same values for both these categories. We would suggest that these categories do not effectively differentiate the home versus center based programs and in the future the scale could be simplified by eliminating these two questions.

Cardiovascular
One trial (King 1991,King 1995) concerning sedentary older adults from California accounted for 225 of the total 372 experimental participants (60%). King's two papers (King 1991,King 1995) report a single study comparing high intensity center based exercise, high intensity home based exercise and low intensity home based exercise over a total follow-up period of two years. For purposes of this systematic review we chose to present the results of the study in three parts. King 1991 (King 1991) represents the comparison of the high intensity center based exercise program with the high intensity home based program at one year. King II 1991 (King II 1991) represents the comparison of the high intensity center based exercise program with the low intensity home based program at one year. King 1995 (King 1995) represents the comparison of the high intensity center based exercise program with the high intensity home based program at two years. King measured treadmill performance (VO2 max and duration) over the two year study.

There were three trials (79 participants) carried out in individuals with intermittent claudication from peripheral vascular disease (PVD) (Patterson 1997,Regensteiner 1997; Savage 2001). All three trials were from the USA.

Regensteiner et al (Regensteiner 1997) looked at 20 individuals with PVD using the 'walking impairment questionnaire' (WIQ) which is a validated measure of walking function in patients with PVD. Participants were randomised to a home or center based program. Regensteiner (Regensteiner 1997) measured peak walking time, peak oxygen consumption (VO2 max), peak heart rate, peak respiratory exchange ratio and pain-free walking time on a graded treadmill protocol at the beginning and end (after 3 months) of home and center based programs.

Savage (2001) and Patterson (1997) randomised patients with PVD into home and center based exercise programs. Savage (Savage 2001) measured VO2 max as well as the absolute claudication distance and initial claudication distance using a graded treadmill protocol at baseline, 3 and 6 months. Patterson (Patterson 1997) measured maximum (peak) walking time, and claudication pain time (equivalent to the pain-free walking time above) using a graded treadmill protocol at baseline,3 and 6 months. Each measured quality of life (using the SF36) at baseline, completion of program (3 months) and at 6 months follow-up.

Chronic Obstructive Pulmonary Disease (COPD)
Two trials (both from Europe) with a total of 68 participants (P-Maestu 2000 (II), P-Maestu 2003, Strijbos 1996), concerned individuals with chronic obstructive pulmonary disease (COPD). Strijbos et al (Strijbos 1996) measured the 4 min walk test in 41 patients with COPD, randomised to home, center or control rehabilitation groups up to 18 months. Although 'walk tests' were generally designed to measure exercise tolerance, constructs of functional exercise capacity (the ability to undertake [strenuous] activities of daily living) appear to be reflected in these measures hence we accepted this as a primary measure of function.

In the other study (P-Maestu 2000 (II)) 41 patients with COPD were followed before and after an eight-week home or center based exercise program. They measured quality of life before and after training using the validated chronic respiratory questionnaire.

Osteoarthritis
No studies were identified

Risk of bias in included studies

Cardiovascular
Allocation concealment was 'unclear' in all the studies except one (King 1991,King 1995), which used an acceptable centralized computer generated allocation procedure. None of the participants in the included studies were blinded to the interventions (for obvious reasons). None of the investigators/assessors appeared to be blinded either however.

In one study (Patterson 1997) with a follow-up interval of 6 months the dropout rate reached 37%. The dropouts were well described in the study (the majority for medical reasons) and were equally distributed in both intervention groups. In the remaining two studies of PVD the dropout rate was zero.

We used the 'criteria list for the methodological quality assessment' recommended by the Cochrane Back Review Group for Spinal Disorders (van Tulder 1997). Ten questions address internal validity specifically and we used the total score to categorise the papers into 'poor', 'medium' and 'high' quality (e.g. score 1.0-3.9/10 is poor, 4.0-6.9/10 is medium and 7.0+ high). Three studies were 'medium' quality and one (Savage 2001) was 'poor'.

Chronic Obstructive Pulmonary Disease (COPD)
Allocation concealment was 'unclear' in all the studies. None of the participants in the included studies were blinded to the interventions (for obvious reasons). None of the investigators/assessors appeared to be blinded either however. Dropouts were well described and reached a maximum of approximately 16%. Both studies were 'medium' quality.

Osteoarthritis

No studies were identified

Effects of interventions

Cardiovascular

Primary outcome measure: Measures of functional activity (ADLs, walking ability, and so on)
Only one study measured function (Regensteiner 1997). After three months the WIQ scores had improved significantly by 24%, 15% and 15% in terms of ability to walk distances, speed and claudication severity in the center based exercise program and by 13% in the home based program in terms of ability to walk distances. Unfortunately comparison of these changes was not reported between the two groups.

A) Secondary outcome measures (general):
1. Long-term maintenance of physical activity (e.g. activity log book, CHAMPS questionnaire etc)
From King's two papers (King 1991,King 1995), at one year follow-up 75.1-78.7% of the home based participants were still maintaining (adhering to) their exercise program compared with 52.6% of the center based (p<0.0005). This difference was maintained at the 2 year mark between the high intensity home based (67.8%) and high intensity center based programs (36.4%) but notably the adherence rate in the low intensity home based program dropped off dramatically to 49% (p=<0.0029 compared with the high intensity home based program) soon after the one year mark. This was felt by the authors to be caused by a reduction in follow-up resources and support for this group (that occurred at the 1 year mark) and the increased difficulty in maintaining a 5 times weekly exercise schedule versus a 3 times weekly schedule (that the high intensity programs used). We therefore did not consider data from the low intensity home based program after one year.

2.Measures of Quality of Life (SF36, SIP etc)
Regensteiner (Regensteiner 1997) administered the SF20 measure at the beginning and end of the home and center based exercise programs. Compared with baseline values only the physical sub-component for the center based group improved significantly (mean 52 [sd 19] to 72 [sd18]) there was no apparent difference between groups.

Savage (Savage 2001) found no significant changes in any of the components of the SF36. Patterson (Patterson 1997) however found significant improvements at the 3 and 6 month follow-up, compared with baseline, for the physical function, pain and standard physical component subscales for both exercise programs. For the center based program the physical function improved from a mean of 43 (sd 17.7) to 52 (sd 22.2) after the program to 56 (sd 14.4) at 6 months. For the home based program physical function improved from 41(sd 20.8) to 53 (sd 24.4) after the program to 54 (sd 23.5) at 6 months. There was no significant difference between exercise groups.

3. Cost
None of the studies addressed cost issues

4. Health Service utilization
None of the studies addressed health service utilization issues

B) Secondary Cardiovascular related measures (Mortality, Rates of Cardiovascular diseases, Exercise capacity, CV Risk factor reduction)

King (King 1991,King 1995) found no significant change in blood pressure in individuals participating in three different exercise groups (higher and lower intensity home based and a center based group) at the one and two year follow-up points. At one year follow-up there was no significant change in lipid levels for any of the treatment groups. At two years however both home based groups had a significant increase in HDL cholesterol levels (4.3% and 8.5% for the higher and lower intensity programs respectively) compared with baseline. The difference was not significant between program types however. Of interest a sub-group analysis by frequency of exercise within exercise groups showed a convincing association between increased exercise levels and increased HDL levels. None of the other cardiovascular risk factors measured (Body Mass Index and smoking rates) changed significantly.

In Regensteiner (Regensteiner 1997), the group who underwent the center based program experienced significantly improved peak walking time (4.6 [sd 2.4] min to 10.9 [sd 4.5] min), peak oxygen consumption (14.6 [sd 1.9] mL/kg/min to 17.1[sd 2.0] mL/kg/min), peak respiratory exchange ratio (0.95 [sd 0.07] to 0.99 [sd 0.07]) and pain-free walking time (2.0 [sd 1.3] min to 5.0 [sd 3.4] min). Only the peak walking time was significantly improved compared to the home based group (p=<0.05). In Savage (Savage 2001), there were no significant changes seen in peak oxygen consumption in either group. In the center based group the absolute claudication distance significantly improved at both the 3 month and 6 month follow-ups compared with baseline values (521.5 [sd 263.4]m at baseline to 833.3 [sd 376.3]m at 3 months to 741.9 [sd 365.6]m at 6 months). For the home based program improvements were also seen at 6 months (532.2 [sd 263.5]m to 715.0 [sd 394.4]m) but not at 3 months. There was no significant difference between groups however. The initial claudication distance was significantly improved at 6 months (241.2 [sd 188.2]m at baseline to 483.8 [sd 317.2]m at 6 months) in the center based group but not at 3 months and there were no significant differences seen at any time in the home based group. The improvement seen in the center based group at 3 months was significantly better than seen in the home based group (p<0.01) and at 6 months there was still a trend towards significance (p<0.1).

In Patterson (Patterson 1997), both the home and center based groups experienced significant improvements in the maximum walking time and claudication pain time at 3 and 6 months. The home based group improved by 131% in claudication pain time and 70% in maximum walking time at 6 months, and the center based group improved by 337% and 207% respectively. There was a significant difference in both these measures, favouring the center based group over home based, at 3 and 6 months (p<0.004).

King (King 1991,King 1995) measured treadmill performance (VO2 max and duration) over the two year study. All three exercise treatment groups (higher and lower intensity home based groups and a 'center based' group) showed significantly greater improvements in VO2 max and treadmill duration compared with controls. The mean improvement in VO2 max for males at one year was 1.7(sd 4.1), 1.2(sd 3.8) and 1.4(sd 3.8) ml/kg/min for the 'center based', higher and lower intensity home based groups respectively compared with a mean change of -0.3(sd 2.6) ml/kg/min in controls. The mean improvement in VO2 max for females at one year was 0.6(sd 2.5), 1.4(sd 2.8) and 0.9(sd 1.6) ml/kg/min for the 'center based', higher and lower intensity home based groups respectively compared with a mean change of -0.9(sd 2.0)

ml/kg/min in controls. This difference was maintained in all three groups at 2 years also (with the higher intensity home based group achieving a significantly higher VO2 max even than the other two treatment groups). The mean improvement in treadmill duration for males at one year was 2.2(sd 2.3), 1.8(sd 2.6) and 1.6(sd 2.3) min for the 'center based', higher and lower intensity home based groups respectively compared with a mean change of 0.9(sd 1.8) min in controls. The mean improvement in VO2 max for females at one year was 1.3(sd 1.7), 1.1(sd 1.3) and 1.0(sd 1.2) min for the 'center based', higher and lower intensity home based groups respectively compared with a mean change of 0.0(sd 2.3) min in controls.

Chronic Obstructive Pulmonary Disease (COPD)

Primary outcome measure: Measures of functional activity (ADLs, walking ability, etc.)
Only one study measured function (Strijbos 1996). In the center based group walking distance significantly increased after the 3 month program and for a further 3 months after, but walking distance then fell at the 6 and 12 month marks following this. At the 18 month follow-up visit there was no significant difference (from baseline) in the center based group. In contrast the home based exercise group experienced significant increases in distance which were still maintained after 18 months. The changes achieved did not appear to be significant between groups however. Both home and center based exercise programs produced significant improvements in maximal work levels and 4 min walking distance measures from baseline but not between exercise types. This benefit persisted for up to 18 months after finishing the program in the home based exercise group but for only 3-6 months in the center based group.

A)Secondary outcome measures (general):
1. Long-term maintenance of physical activity (e.g. activity log book, CHAMPS questionnaire etc)
None of the studies measured this outcome

2. Measures of Quality of Life (SF36, SIP etc)
Strijbos (Strijbos 1996) asked participants whether they felt 'better', 'equal' or 'worse' at the end of the program (3 months) and again at 18 months. Compared with controls, significantly more participants in the exercise groups experienced 'better' general well-being at 3 months (80% for center, 73% for home versus 47% for control) and 18 months (62% for center, 64% for home versus 50% for control). There was no significant difference between home and center groups however.

Similar to Strijbos above, Puente-Maestu (P-Maestu 2000 (II), P-Maestu 2003) , found significant improvements in the total and all four sub-scales of the measure for each exercise program compared with baseline (mean total score pretraining was 80.2 [sd 17.3] in the center based group and 93.1 [sd 16.2] after, and 84.2 [sd 13.9] pretraining in the home based group and 101 [sd 17.2] after). There was no significant difference between the two types of program however. This improvement in quality of life was maintained at 13 months follow-up (but again there was no difference between groups). Despite no change noted in quality of life (as measured by the chronic respiratory questionnaire [CRQ]) nor in lung function testing between the two groups (although both groups had significant improvements, at the end of 8 weeks, in all the components of the CRQ and in forced expiratory volume in one second (FEV1) and max inspiratory volume), the center based exercise group however was clearly superior in terms of a variety of parameters measured by exercise stress testing and constant exercise test measurements. Longer term follow-up of 39 of these patients showed that the physiological gains were lost soon after the end of the 8 week exercise programs (despite the instigation of a maintenance program for both groups). After 13 months there was no difference between the groups on any measure.

3. Cost
None of the studies addressed cost issues

4. Health Service utilization
None of the studies addressed health service utilization issues

B) Secondary COPD related (mortality, lung function tests, exercise capacity)

Puente-Maestu (P-Maestu 2000 (II), P-Maestu 2003) found significant reductions in diastolic blood pressure post exercise compared with pre for both exercise groups (95+/-11 mmHg to 91+/-8mmHg after training in the center based group and 92+/-8mmHg to 89+/-9mmHg in the home based group). There was no significant difference between groups. This was not sustained at 13 month follow-up.

Strijbos (Strijbos 1996), evaluating COPD patients on a cycle ergometer, found significantly improved maximal work levels (W max) of 19.8% after the center based exercise program (from baseline). At 6, 12 and 18 month follow-up however this fell back to non significant levels. In comparison the home based exercise group experienced a 20%+ improvement after the program that was maintained through to 18 months of follow-up. This difference did not reach statistical significance between treatment groups however. There was no difference in arterial blood gas analysis and basic spirometry values before and after the home and center based exercise programs, nor for up to 18 months of follow-up. Puente-Maestu (P-Maestu 2000 (II),P-Maestu 2003) however did find statistically significant improvements in forced expiratory volume in 1 sec (FEV1) and maximal inspiratory pressure at residual volume (MIP) in both the home and center based programs. There was no significant difference between exercise types however. The FEV1 changed from a mean of 1.09(sd 0.15)L before exercise to a mean of 1.16(sd 0.17)L in the center based program and from 1.09(sd 0.7)L to 1.15(sd 0.21)L in the home based group. The MIP changed from a mean of 63(sd 15) cmH2O before exercise to a mean of 70(sd 12) cmH2O in the center based program and from 58(sd 17) cmH2O to 68(sd 13) cmH2O in the home based group. Again at 13 months follow-up all these improvements had disappeared. The time on the treadmill, at a constant work rate, significantly improved in both groups (from a mean of 8.9 min to 16.0 min after the center based exercise program and from 8.9 min to 12 min in the home based group) but the center based group was superior to home. At 13 months the time had fallen in both groups (but was still significantly improved from baseline) and was no longer significantly different between groups.

Osteoarthritis
No studies were identified

DISCUSSION

Only six clinical trials (eight papers) examining the effects of home based exercise versus center based exercise in older adults with

cardiorespiratory or arthritis inclusion criteria were found. The studies represent a total of 372 participants who were enrolled into either type of exercise program. One study (King 1991, King 1995) was responsible for 2/3 of the subjects enrolled and the remaining five studies equally contributed to the remaining 1/3 sample. Fortunately the King study (King 1991, King 1995) also received the highest quality score compared with the others. Also this study enrolled sedentary (but otherwise healthy) older adults making it probably more generalizable to the older adult population than the other five studies, which dealt with individuals who had specific disease states.

This review may be more notable for the gaps in our knowledge rather than for what we found. Only two studies used a measure of function (the primary outcome for this review) as an outcome measure which is somewhat of a concern given the intrinsic importance of this measure to the individual, family, society etc. None of the studies looked at cost or health utilization despite these being critical measures in the design and justification for exercise programs of this nature. Only three 'types' of participant groups were represented in the review, individuals with COPD, PVD and those who were sedentary. Other obvious categories of risk factors (hyperlipidemia, obesity, hypertension, and so on) and diseases (osteoarthritis, ischemic heart disease and so on) have not been studied. In addition the review highlighted some methodological flaws in current research design in this area, particularly in the area of blinding. We accept that blinding participants to intervention is usually not possible in this type of research. Blinding of the evaluators however should be achieveable and yet only one of the studies attempted this.

In terms of the primary outcome of the review (functional measures), two studies (Regensteiner 1997, Strijbos 1996) showed that home and center based exercise programs improved function significantly but there was no difference found between the two types of exercise.

For the secondary measures home based programs appear to have a considerably better adherence rate than center based programs. King (King 1991, King 1995) in a two year follow-up of 300 participants found an adherence rate in the home based program (higher intensity) twice that of the center based program. Of interest in one of the two home based programs the adherence rate dropped dramatically at the one year mark coinciding with the withdrawal of regular follow-up contacts with this group. This finding suggests that when describing home based programs it may be important to evaluate the impact of non-direct supervision such as telephone follow-up.

All three of the studies looking at patients with PVD (Patterson 1997, Regensteiner 1997, Savage 2001) found that center based exercise programs improved certain parameters of treadmill performance namely the measures related to claudication pain (initial claudication distance, time to claudication pain and maximum walk distance) in the short-term (at 3 months and in one study up to 6 months). However, it is important to note that the center based exercise programs all used treadmill exercise as a key (sometimes exclusive) component of the exercise training, whereas the home based programs did not. The use of treadmill exercise as an outcome measure then may reflect a bias (training effect) in favour of the center based programs. In the same studies there was no statistically significant difference (between home and center based programs) in the other outcomes measured. Shaw 1996 (Shaw 1996) showed how even a single 'orientation' session improved a wide range of physiological measures on a subsequent incremental cycle ergometer test in older adults.

In the longer follow-up studies (Strijbos 1996 for 18 months, and King 1991, King 1995 for 2 years) there was a trend noted that the improved outcomes tended to persist for longer in the home based programs and the short-term improvements in center based programs disappeared (P-Maestu 2003). Presumably this may be strongly correlated with higher rates of adherence in the home based programs.

AUTHORS' CONCLUSIONS

Implications for practice

Cardiovascular

Home based programs appear to have better adherence rates than center based programs. In the long-term this may translate into more long lasting positive benefits at least in sedentary older adults. Intensity and type of support may be the most important factor in increasing adherence rates.

In patients with peripheral vascular disease center based programs are superior to home programs at improving distance walked and time to claudication pain up to 6 months. However we consider the risk of a training effect to be high in these studies as the center based groups were trained primarily on treadmills (the home based were not) and the outcome measures were treadmill based. There are no longer term studies in this population.

Chronic Obstructive Pulmonary Disease (COPD)

In patients with COPD the evidence in the short-term is conflicting. One study (P-Maestu 2000 (II)) showed center based programs superior to home based in terms of parameters measured on exercise testing at 2 months. Another study (Strijbos 1996) showed significant improvements in both types of exercise at 3 months (but no difference between groups). In P-Maestu's study however the initial advantage in the center based group disappeared at 13 months follow-up (P-Maestu 2003). In the Strijbos study, the improvements persisted through to the end of the study at 18 months for the home based program but not for the center based.

Osteoarthritis

No conclusions can be made at present, some of the findings from other studies may be generalisable to this population.

Implications for research

The reasons for the better adherence to exercise in the home based programs need to be investigated further, this would have tremendous implications for the future design of such programs.

No studies have been done looking at the cost effectiveness of the two types of exercise programs, nor of any potential benefits in terms of (reduced) health utilization.

Large sections of the population with various risk factors and/or diseases that may benefit from these types of exercise programs have not been studied (e.g. osteoarthritis).

Attention to rigorous research methodology, particularly in blinding evaluators may result in immediate improved quality research in this area.

The Bottom Line

There is "silver" level evidence that in the long-term, older adults in 'home based' physical activity programs stick to their exercises much more than participants in 'center based' programs do.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

King 1991

Methods	Randomised, controlled, parallel group trial, unblinded
Participants	357 sedentary adults, free of cardiovascular disease (aged 50-65 years)
Interventions	'High intensity' supervised exercise (60min predominantly aerobic, walking/jogging/cycling to 73-88% max HR, 3 x wk) 'High intensity' home exercise (60min predominantly aerobic, walking/jogging/cycling to 73-88% max HR, 3 x wk) 'Low intensity' home exercise (30min predominantly aerobic, walking/jogging/cycling to 60-73% max HR, 5 x wk) and control (continued with 'usual' activity)
Outcomes	At one year treadmill performance was significantly improved in the three exercise groups. There was no difference in outcomes between the low and high intensity groups. Participation rates were significantly better for the home-based exercise groups Blood lipid levels, weight and blood pressure were unchanged
Notes	General community in California, USA

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

King 1995

Methods	Randomised, controlled, parallel group trial, unblinded
Participants	169 of 357 sedentary adults, free of cardiovascular disease (aged 50-65 years) - long term follow-up of earlier study see King 1991
Interventions	'High intensity' supervised exercise (60min predominantly aerobic, walking/jogging/cycling to 73-88% max HR, 3 x wk) 'High intensity' home exercise (60min predominantly aerobic, walking/jogging/cycling to 73-88% max HR, 3 x wk) 'Low intensity' home exercise (30min predominantly aerobic, walking/jogging/cycling to 60-73% max HR, 5 x wk) and control (continued with 'usual' activity)
Outcomes	At two years treadmill performance was still significantly improved in the three exercise groups. There was no difference in outcomes between the low and high intensity groups. Participation rates were significantly better fot the high intensity home based group HDL Cholesterol levels were higher for the two home based groups and waist-to-hip ratios were lower.
Notes	General community in California, USA

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

King II 1991

Methods	Randomised, controlled, parallel group trial, unblinded
Participants	357 sedentary adults, free of cardiovascular disease (aged 50-65 years)
Interventions	'High intensity' supervised exercise (60min predominantly aerobic, walking/jogging/cycling to 73-88% max HR, 3 x wk) 'High intensity' home exercise (60min predominantly aerobic, walking/jogging/cycling to 73-88% max HR, 3 x wk) 'Low intensity' home exercise (30min predominantly aerobic, walking/jogging/cycling to 60-73% max HR, 5 x wk) and control (continued with 'usual' activity)
Outcomes	At one year treadmill performance was significantly improved in the three exercise groups. There was no difference in outcomes between the low and high intensity groups. Participation rates were significantly better for the home-based exercise groups Blood lipid levels, weight and blood pressure were unchanged
Notes	General community in California, USA

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

P-Maestu 2000 (II)

Methods	Randomised, parallel group design
Participants	49 patients with stable COPD referred to rehabilitation program by pulmonologist
Interventions	8 week supervised treadmill (60min 4 x wk) versus 8 week unsupervised home walking program (3-4 km 4 x wk)
Outcomes	In the incremental and constant work-rate exercise test the VO2 max, duration on treadmill, VCO2, lactate accumulation and respiratory rate were improved more in the center based group. There was no difference in quality of life or lung function tests (between groups).
Notes	Eight dropouts were not included in analysis. See P-Maestu 2003 which appears to be a longer term follow-up Study conducted in Madrid Spain

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

P-Maestu 2003

Methods	Randomised, parallel group design
Participants	49 patients with stable COPD referred to rehabilitation program by pulmonologist
Interventions	8 week supervised treadmill (60min 4 x wk) versus 8 week unsupervised home walking program (3-4 km 4 x wk). Both then were followed up 11 months later.
Outcomes	In the incremental and constant work-rate exercise test the VO2 max, duration on treadmill, VCO2, lactate accumulation and respiratory rate were improved more in the center based group. There was no difference in quality of life or lung function tests (between groups). After 13 months however there was no significant difference between groups.
Notes	Eight dropouts were not included in analysis. See text (possible longer term follow-up of P-Maestu 2000)

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Patterson 1997

Methods	Randomised, parallel group design
Participants	55 patients with arterial claudication symptoms >3 months (aged 50-75 years)
Interventions	12 week supervised exercise (predominantly aerobic, treadmill 1hr 3 x wk) versus 12 week unsupervised (walking for 20-40min 3 x wk)
Outcomes	At 6 months maximum walking time to claudication and claudication pain time was significantly reduced in the supervised exercise group. There was no difference in SF-36 scores between groups.
Notes	17 dropouts at 6 months. Study conducted in USA

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Regensteiner 1997

Methods	Randomised, parallel group design
Participants	20 participants with 'disabling' intermittant [arterial]claudication Must be able to walk at >2mph on treadmill, no exercise limitation from angina, COPD, CHD, arthritis and no diabetes. Patients were excluded also if they had undergone vascular surgery or angioplasty in the previous one year.

Regensteiner 1997 *(Continued)*

Interventions	12 weeks hospital based supervised treadmill exercise (35-50min 3 x wk) versus 12 weeks home walking program (35-50min 3 x wk)
Outcomes	Peak walking time significantly improved in the supervised program versus home program. Other parameters in the treadmill performance test, walking impairment questionaire and medical outcomes study improved from baseline in the supervised program (almost none improved in the home)
Notes	Study performed in USA

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Savage 2001

Methods	Randomised parallel group design
Participants	21 patients (age >50 years) with intermittent claudication Number of exclusion including 'severe' cardiopulmonary disease and arthritis
Interventions	12 week supervised hospital treadmill program (15-40min 3 x wk) versus 12 week home walking program (15-40min 3 x wk)
Outcomes	The supervised group had a significantly greater improvement in initial claudication distance at 12 weeks but not at 24. There was no difference in absolute claudication distance nor in SF-36
Notes	Study done in USA

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Strijbos 1996

Methods	Randomised, controlled, parallel groups design
Participants	50 outpatients with stable COPD. No evidence of ischemic heart disease, musculoskeletal disorders, or other 'disabling' diseases
Interventions	Hospital based supervised exercise (breathing & relaxation exercises, bronchial hygiene, walking/stair climbing and stationary bicycles, 1 hr 2x wk) Home-care exercise program (breathing & relaxation exercises, bronchial hygiene, walking/stair climbing and stationary bicycles, 30min 2x wk) Control (usual medical care only)
Outcomes	No significant differences were found between exercise groups.

Strijbos 1996 *(Continued)*	However improvements in maximal work level, 4-min walking distance, fatigue and general well-being scores from baseline were maintained for much longer in the home-care group (up to 18 months)
Notes	Study done in Netherlands

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

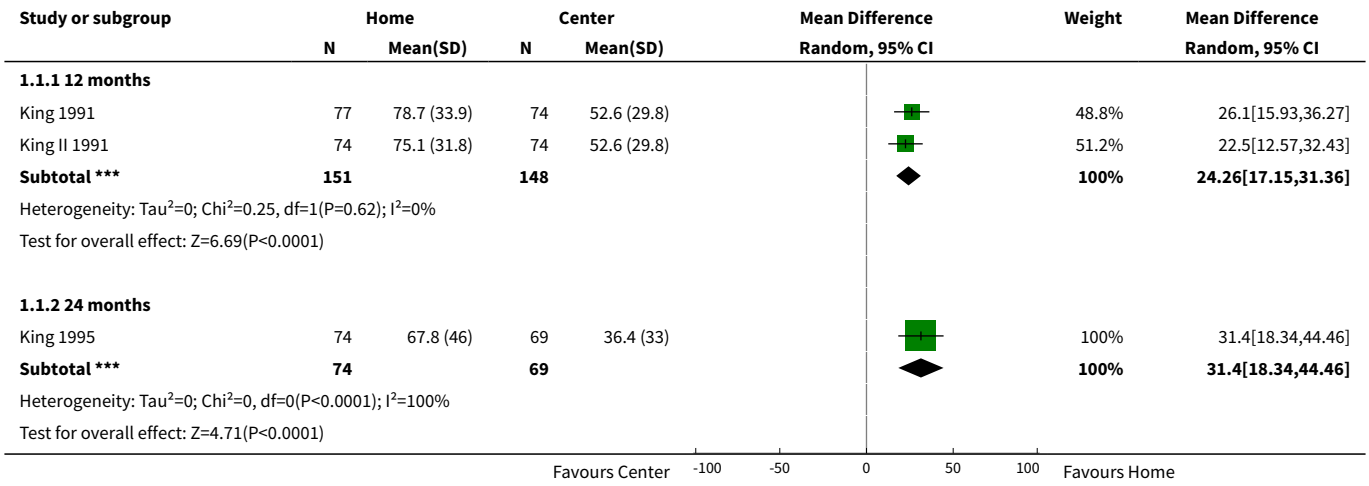
DATA AND ANALYSES

Comparison 1. Cardiovascular

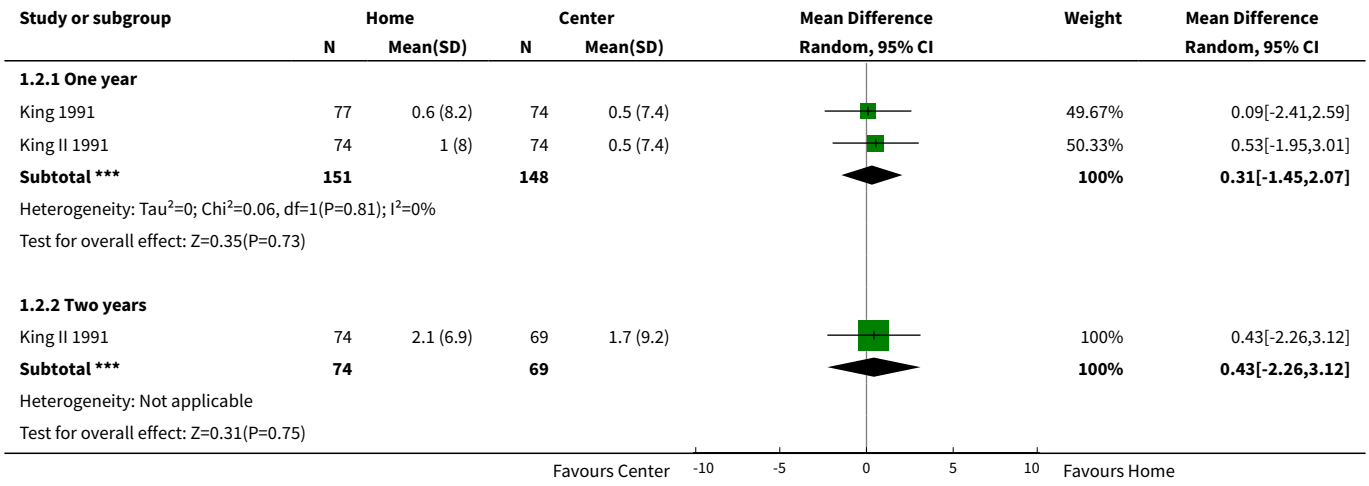
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Exercise participation (% of max available time)	3		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.1 12 months	2	299	Mean Difference (IV, Random, 95% CI)	24.26 [17.15, 31.36]
1.2 24 months	1	143	Mean Difference (IV, Random, 95% CI)	31.40 [18.34, 44.46]
2 HDL Cholesterol	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
2.1 One year	2	299	Mean Difference (IV, Random, 95% CI)	0.31 [-1.45, 2.07]
2.2 Two years	1	143	Mean Difference (IV, Random, 95% CI)	0.43 [-2.26, 3.12]
3 LDL Cholesterol	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.1 One year	2	299	Mean Difference (IV, Random, 95% CI)	2.88 [-2.77, 8.52]
3.2 Two years	1	143	Mean Difference (IV, Random, 95% CI)	6.98 [-2.02, 15.98]
4 Total Cholesterol	3		Mean Difference (IV, Random, 95% CI)	Subtotals only
4.1 One year	2	299	Mean Difference (IV, Random, 95% CI)	2.74 [-3.25, 8.74]
4.2 Two years	1	143	Mean Difference (IV, Random, 95% CI)	7.11 [-2.86, 17.08]
5 Triglycerides	3		Mean Difference (IV, Random, 95% CI)	Subtotals only
5.1 One year	2	299	Mean Difference (IV, Random, 95% CI)	0.53 [-14.37, 15.42]
5.2 Two years	1	143	Mean Difference (IV, Random, 95% CI)	5.85 [-10.38, 22.08]
6 VO2 max	2		Mean Difference (IV, Random, 95% CI)	Subtotals only
6.1 One year	2	299	Mean Difference (IV, Random, 95% CI)	0.02 [-0.74, 0.78]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
6.2 Two years	1	143	Mean Difference (IV, Random, 95% CI)	1.00 [-0.37, 2.37]
7 Treadmill duration (min)	3		Mean Difference (IV, Random, 95% CI)	Subtotals only
7.1 One year	2	299	Mean Difference (IV, Random, 95% CI)	-0.35 [-0.82, 0.12]
7.2 Two years	1	143	Mean Difference (IV, Random, 95% CI)	0.37 [-0.41, 1.15]

Analysis 1.1. Comparison 1 Cardiovascular, Outcome 1 Exercise participation (% of max available time).



Analysis 1.2. Comparison 1 Cardiovascular, Outcome 2 HDL Cholesterol.

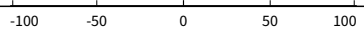


Analysis 1.3. Comparison 1 Cardiovascular, Outcome 3 LDL Cholesterol.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
1.3.1 One year							
King 1991	77	-6.3 (24.9)	74	-9.1 (25.5)		49.35%	2.73[-5.31,10.77]
King II 1991	74	-6 (23.8)	74	-9.1 (25.5)		50.65%	3.02[-4.91,10.95]
Subtotal ***	**151**		**148**			**100%**	**2.88[-2.77,8.52]**
Heterogeneity: Tau^2=0; Chi^2=0, df=1(P=0.96); I^2=0%							
Test for overall effect: Z=1(P=0.32)							
1.3.2 Two years							
King II 1991	74	-12.3 (21.6)	69	-19.3 (31.9)		100%	6.98[-2.02,15.98]
Subtotal ***	**74**		**69**			**100%**	**6.98[-2.02,15.98]**
Heterogeneity: Not applicable							
Test for overall effect: Z=1.52(P=0.13)							

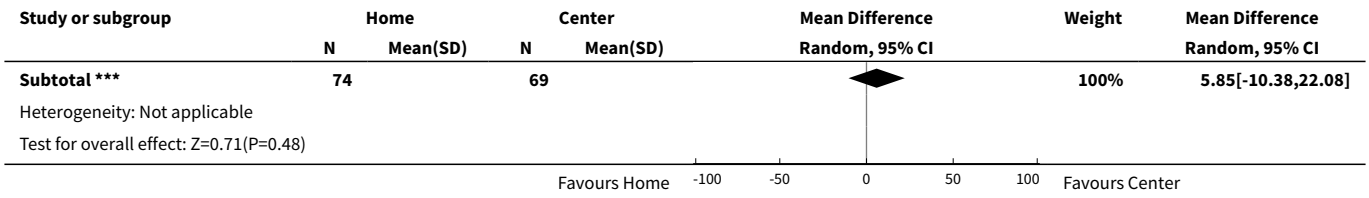
Analysis 1.4. Comparison 1 Cardiovascular, Outcome 4 Total Cholesterol.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
1.4.1 One year							
King 1991	77	-4.9 (26.6)	74	-7.9 (28.3)		46.88%	2.95[-5.81,11.71]
King II 1991	74	-5.3 (22.5)	74	-7.9 (28.3)		53.12%	2.56[-5.67,10.79]
Subtotal ***	**151**		**148**			**100%**	**2.74[-3.25,8.74]**
Heterogeneity: Tau^2=0; Chi^2=0, df=1(P=0.95); I^2=0%							
Test for overall effect: Z=0.9(P=0.37)							
1.4.2 Two years							
King 1995	74	-9.7 (25.6)	69	-16.8 (34.3)		100%	7.11[-2.86,17.08]
Subtotal ***	**74**		**69**			**100%**	**7.11[-2.86,17.08]**
Heterogeneity: Tau^2=0; Chi^2=0, df=0(P<0.0001); I^2=100%							
Test for overall effect: Z=1.4(P=0.16)							

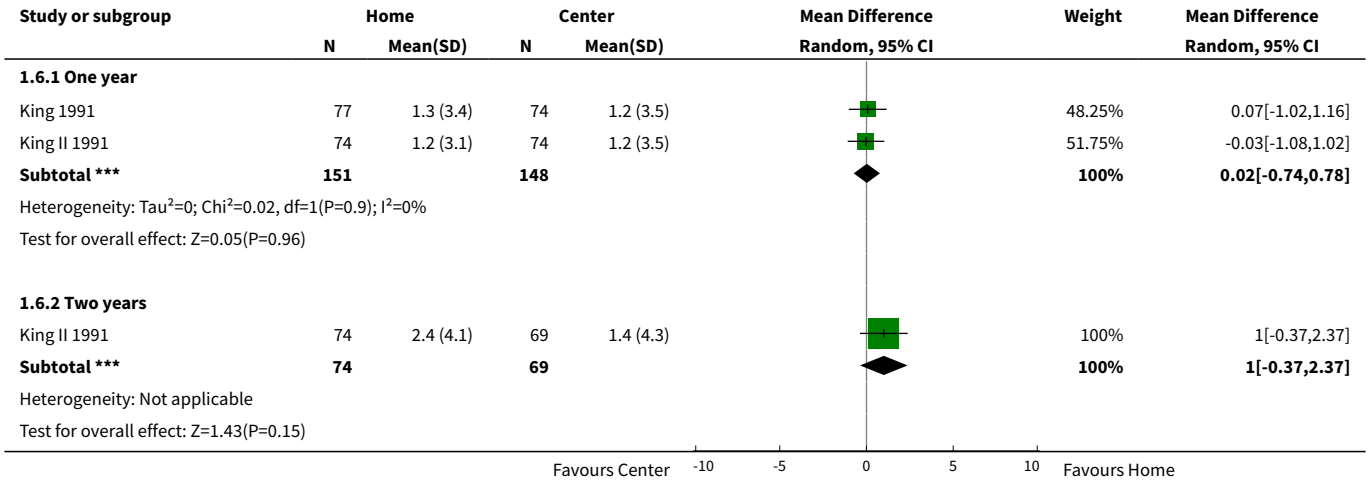


Analysis 1.5. Comparison 1 Cardiovascular, Outcome 5 Triglycerides.

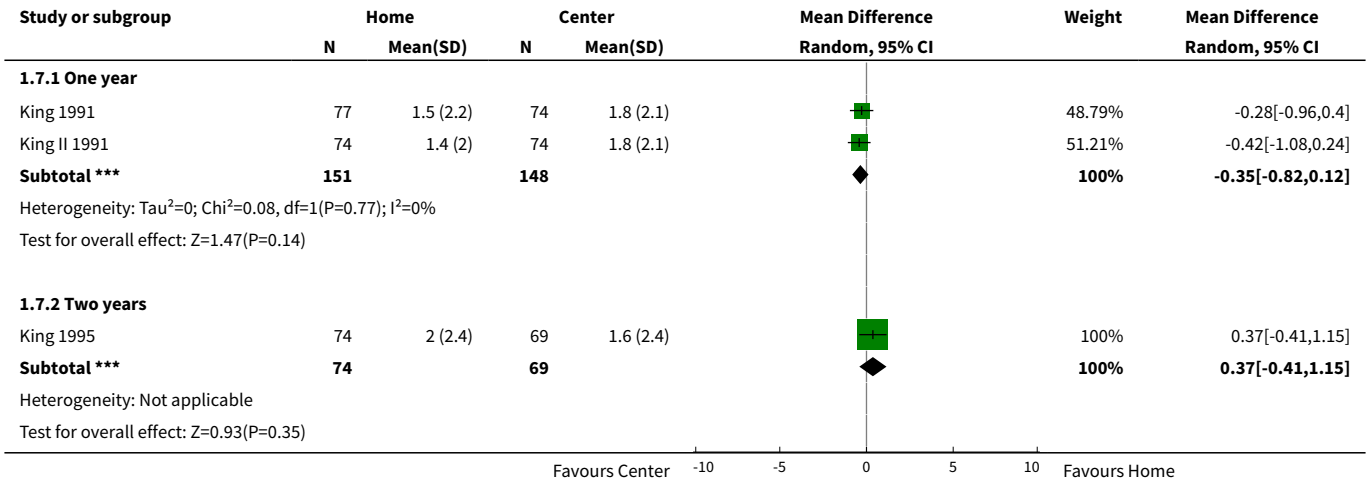
Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
1.5.1 One year							
King 1991	77	5.7 (55.5)	74	-3.3 (62.3)		41.53%	9.05[-9.79,27.89]
King II 1991	74	-3.3 (62.3)	74	2.9 (31.3)		58.47%	-6.25[-22.13,9.63]
Subtotal ***	**151**		**148**			**100%**	**0.53[-14.37,15.42]**
Heterogeneity: Tau^2=37.99; Chi^2=1.48, df=1(P=0.22); I^2=32.45%							
Test for overall effect: Z=0.07(P=0.94)							
1.5.2 Two years							
King 1995	74	9.3 (53.7)	69	3.4 (45.3)		100%	5.85[-10.38,22.08]



Analysis 1.6. Comparison 1 Cardiovascular, Outcome 6 VO2 max.



Analysis 1.7. Comparison 1 Cardiovascular, Outcome 7 Treadmill duration (min).

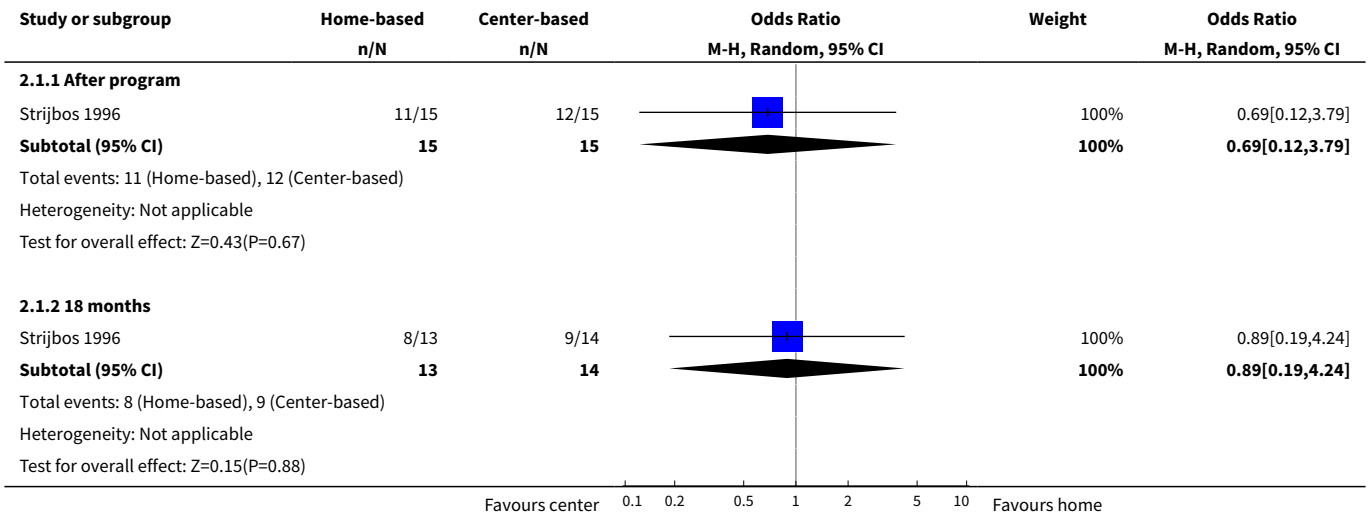


Comparison 2. COPD

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Quality of Life (General well-being)	1		Odds Ratio (M-H, Random, 95% CI)	Subtotals only
1.1 After program	1	30	Odds Ratio (M-H, Random, 95% CI)	0.69 [0.12, 3.79]
1.2 18 months	1	27	Odds Ratio (M-H, Random, 95% CI)	0.89 [0.19, 4.24]
2 Chronic respiratory questionaire	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
2.1 Dyspnoea	1	41	Mean Difference (IV, Random, 95% CI)	0.30 [-1.94, 2.54]
2.2 Fatigue	1	41	Mean Difference (IV, Random, 95% CI)	-0.5 [-2.09, 1.09]
2.3 Emotional function	1	41	Mean Difference (IV, Random, 95% CI)	1.90 [-0.64, 4.44]
2.4 Mastery	1	41	Mean Difference (IV, Random, 95% CI)	2.0 [-0.41, 4.41]
2.5 Total	1	41	Mean Difference (IV, Random, 95% CI)	3.30 [-2.84, 9.44]
3 VO2 max	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
3.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-105.0 [-193.41, -16.59]
4 Treadmill duration (min)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
4.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-4.13 [-6.90, -1.36]
5 Heart rate maximum	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
5.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-1.75 [-9.40, 5.90]
6 PaO2 (end)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
6.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-0.31 [-4.24, 3.62]
7 PaCO2 (end)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
7.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-1.22 [-3.91, 1.47]
8 Leg Fatigue (Borg)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
8.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	0.66 [-0.33, 1.65]
9 FEV1	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
9.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-11.0 [-85.07, 63.07]
10 FVC	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
10.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-36.0 [-153.10, 81.10]

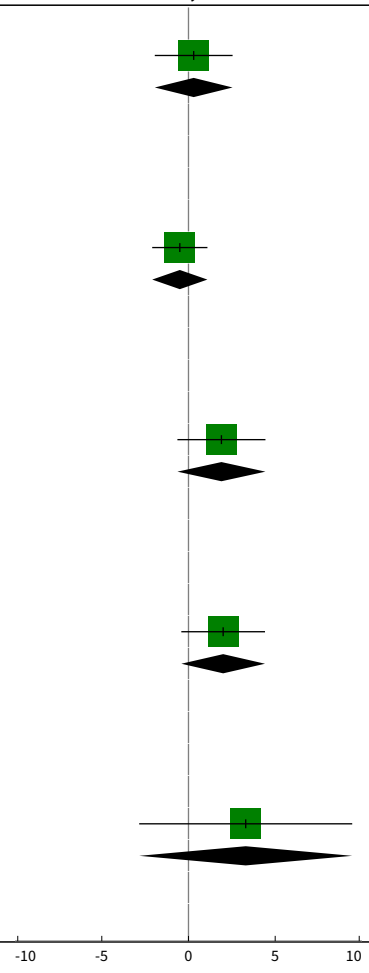
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
11 Total lung capacity	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
11.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-59.0 [-342.52, 224.52]
12 Functional residual capacity	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
12.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-42.00 [-316.12, 232.12]
13 Pulmonary transfer factor for CO	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
13.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-0.11 [-0.76, 0.54]
14 Max Inspiratory Pressure at residual volume	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
14.1 Two Months	1	41	Mean Difference (IV, Random, 95% CI)	1.40 [-6.87, 9.67]
15 Max Expiratory Pressure at TLC	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
15.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-1.80 [-12.49, 8.89]
16 Pa O2	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
16.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	-1.0 [-5.49, 3.49]
17 Pa CO2	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
17.1 Two months	1	41	Mean Difference (IV, Random, 95% CI)	0.59 [-1.56, 2.74]

Analysis 2.1. Comparison 2 COPD, Outcome 1 Quality of Life (General well-being).



Analysis 2.2. Comparison 2 COPD, Outcome 2 Chronic respiratory questionaire.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.2.1 Dyspnoea							
P-Maestu 2000 (II)	20	3.9 (4.5)	21	3.6 (2.5)		100%	0.3[-1.94,2.54]
Subtotal ***	**20**		**21**			**100%**	**0.3[-1.94,2.54]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.26(P=0.79)							
2.2.2 Fatigue							
P-Maestu 2000 (II)	20	2.7 (2.6)	21	3.2 (2.6)		100%	-0.5[-2.09,1.09]
Subtotal ***	**20**		**21**			**100%**	**-0.5[-2.09,1.09]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.62(P=0.54)							
2.2.3 Emotional function							
P-Maestu 2000 (II)	20	4.9 (3.6)	21	3 (4.7)		100%	1.9[-0.64,4.44]
Subtotal ***	**20**		**21**			**100%**	**1.9[-0.64,4.44]**
Heterogeneity: $Tau^2=0$; $Chi^2=0$, df=0(P<0.0001); $I^2=100\%$							
Test for overall effect: Z=1.47(P=0.14)							
2.2.4 Mastery							
P-Maestu 2000 (II)	20	5 (4.6)	21	3 (3.1)		100%	2[-0.41,4.41]
Subtotal ***	**20**		**21**			**100%**	**2[-0.41,4.41]**
Heterogeneity: Not applicable							
Test for overall effect: Z=1.62(P=0.1)							
2.2.5 Total							
P-Maestu 2000 (II)	20	16.2 (11)	21	12.9 (8.9)		100%	3.3[-2.84,9.44]
Subtotal ***	**20**		**21**			**100%**	**3.3[-2.84,9.44]**
Heterogeneity: Not applicable							
Test for overall effect: Z=1.05(P=0.29)							

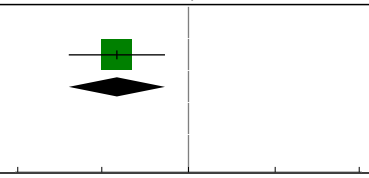


Analysis 2.3. Comparison 2 COPD, Outcome 3 VO2 max.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.3.1 Two months							
P-Maestu 2000 (II)	20	5 (176)	21	110 (101)		100%	-105[-193.41,-16.59]
Subtotal ***	**20**		**21**			**100%**	**-105[-193.41,-16.59]**
Heterogeneity: Not applicable							
Test for overall effect: Z=2.33(P=0.02)							

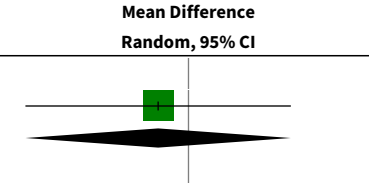
Analysis 2.4. Comparison 2 COPD, Outcome 4 Treadmill duration (min).

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.4.1 Two months							
P-Maestu 2000 (II)	20	3.9 (4.7)	21	8 (4.4)		100%	-4.13[-6.9,-1.36]
Subtotal ***	**20**		**21**			**100%**	**-4.13[-6.9,-1.36]**
Heterogeneity: Not applicable							
Test for overall effect: Z=2.92(P=0)							



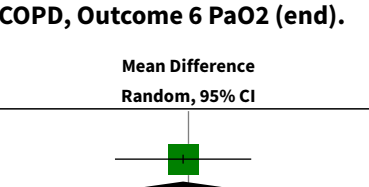
Analysis 2.5. Comparison 2 COPD, Outcome 5 Heart rate maximum.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.5.1 Two months							
P-Maestu 2000 (II)	20	-1.2 (12)	21	0.5 (13)		100%	-1.75[-9.4,5.9]
Subtotal ***	**20**		**21**			**100%**	**-1.75[-9.4,5.9]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.45(P=0.65)							



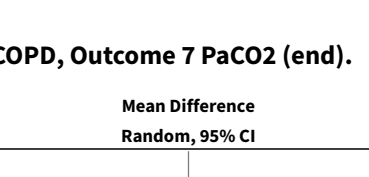
Analysis 2.6. Comparison 2 COPD, Outcome 6 PaO2 (end).

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.6.1 Two months							
P-Maestu 2000 (II)	20	-2 (7.1)	21	-1.7 (5.6)		100%	-0.31[-4.24,3.62]
Subtotal ***	**20**		**21**			**100%**	**-0.31[-4.24,3.62]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.15(P=0.88)							



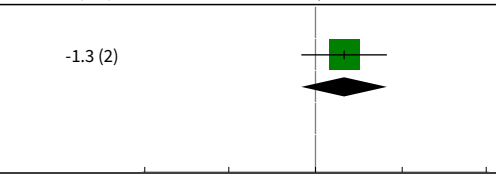
Analysis 2.7. Comparison 2 COPD, Outcome 7 PaCO2 (end).

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.7.1 Two months							
P-Maestu 2000 (II)	20	0.8 (4.1)	21	2.1 (4.7)		100%	-1.22[-3.91,1.47]
Subtotal ***	**20**		**21**			**100%**	**-1.22[-3.91,1.47]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.89(P=0.37)							



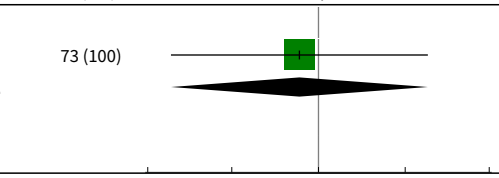
Analysis 2.8. Comparison 2 COPD, Outcome 8 Leg Fatigue (Borg).

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.8.1 Two months							
P-Maestu 2000 (II)	20	-0.6 (1.1)	21	-1.3 (2)		100%	0.66[-0.33,1.65]
Subtotal ***	**20**		**21**			**100%**	**0.66[-0.33,1.65]**
Heterogeneity: Not applicable							
Test for overall effect: Z=1.31(P=0.19)							



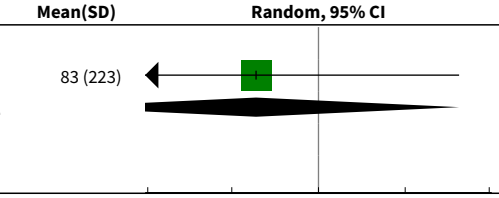
Analysis 2.9. Comparison 2 COPD, Outcome 9 FEV1.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.9.1 Two months							
P-Maestu 2000 (II)	20	62 (138)	21	73 (100)		100%	-11[-85.07,63.07]
Subtotal ***	**20**		**21**			**100%**	**-11[-85.07,63.07]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.29(P=0.77)							



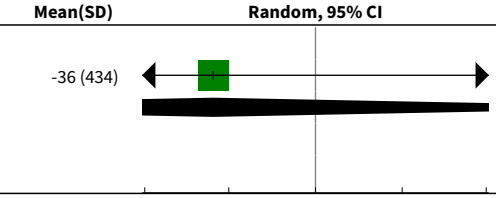
Analysis 2.10. Comparison 2 COPD, Outcome 10 FVC.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.10.1 Two months							
P-Maestu 2000 (II)	20	47 (155)	21	83 (223)		100%	-36[-153.1,81.1]
Subtotal ***	**20**		**21**			**100%**	**-36[-153.1,81.1]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.6(P=0.55)							



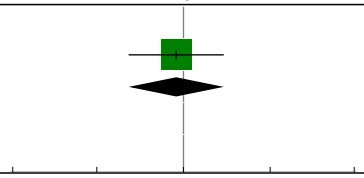
Analysis 2.11. Comparison 2 COPD, Outcome 11 Total lung capacity.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.11.1 Two months							
P-Maestu 2000 (II)	20	-95 (489)	21	-36 (434)		100%	-59[-342.52,224.52]
Subtotal ***	**20**		**21**			**100%**	**-59[-342.52,224.52]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.41(P=0.68)							



Analysis 2.12. Comparison 2 COPD, Outcome 12 Functional residual capacity.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.12.1 Two months							
P-Maestu 2000 (II)	20	-18 (367)	21	24 (519)		100%	-42[-316.12,232.12]
Subtotal ***	**20**		**21**			**100%**	**-42[-316.12,232.12]**
Heterogeneity: Tau²=0; Chi²=0, df=0(P<0.0001); I²=100%							
Test for overall effect: Z=0.3(P=0.76)							



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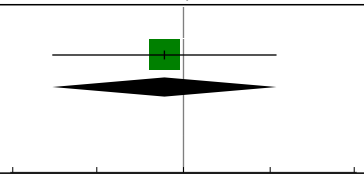
Analysis 2.13. Comparison 2 COPD, Outcome 13 Pulmonary transfer factor for CO.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.13.1 Two months							
P-Maestu 2000 (II)	20	0.1 (1.4)	21	0.2 (0.6)		100%	-0.11[-0.76,0.54]
Subtotal ***	**20**		**21**			**100%**	**-0.11[-0.76,0.54]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.33(P=0.74)							



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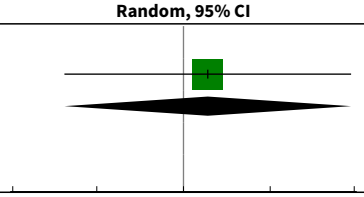
Analysis 2.14. Comparison 2 COPD, Outcome 14 Max Inspiratory Pressure at residual volume.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.14.1 Two Months							
P-Maestu 2000 (II)	20	9.8 (12.9)	21	8.4 (14.1)		100%	1.4[-6.87,9.67]
Subtotal ***	**20**		**21**			**100%**	**1.4[-6.87,9.67]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.33(P=0.74)							



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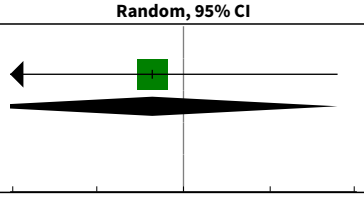
Analysis 2.15. Comparison 2 COPD, Outcome 15 Max Expiratory Pressure at TLC.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.15.1 Two months							
P-Maestu 2000 (II)	20	5.9 (15)	21	7.7 (19.7)		100%	-1.8[-12.49,8.89]
Subtotal ***	**20**		**21**			**100%**	**-1.8[-12.49,8.89]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.33(P=0.74)							



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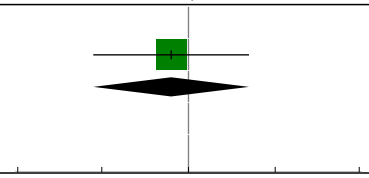
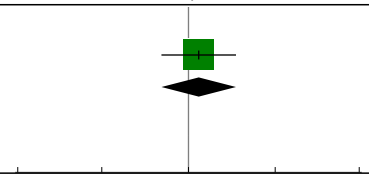
Analysis 2.16. Comparison 2 COPD, Outcome 16 Pa O2.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.16.1 Two months							
P-Maestu 2000 (II)	20	1.1 (7.2)	21	2.1 (7.5)		100%	-1[-5.49,3.49]
Subtotal ***	**20**		**21**			**100%**	**-1[-5.49,3.49]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.44(P=0.66)							



Analysis 2.17. Comparison 2 COPD, Outcome 17 Pa CO2.

Study or subgroup	Home N	Home Mean(SD)	Center N	Center Mean(SD)	Mean Difference Random, 95% CI	Weight	Mean Difference Random, 95% CI
2.17.1 Two months							
P-Maestu 2000 (II)	20	0.5 (4)	21	-0.1 (3)		100%	0.59[-1.56,2.74]
Subtotal ***	**20**		**21**			**100%**	**0.59[-1.56,2.74]**
Heterogeneity: Not applicable							
Test for overall effect: Z=0.54(P=0.59)							



WHAT'S NEW

Date	Event	Description
17 September 2008	Amended	Converted to new review format. C042-R

CONTRIBUTIONS OF AUTHORS

Initial concept and design: NA
Literature review and protocol: NA, EH, BR, KC, SM
Abstract review and Appraisal: NA, EH,BR,SM
Data extraction and analysis: NA,KC
Final discussion and conclusions:NA,EL,BR,KC,SM
Manuscript writting and critique: NA,EL,BR.KC,SM

DECLARATIONS OF INTEREST

We are currently conducting a CIHR funded randomized controlled trial of home versus center based exercise programs in older adults.

SOURCES OF SUPPORT

Internal sources

- University of Saskatchewan, Canada.

External sources

- No sources of support supplied

INDEX TERMS

Medical Subject Headings (MeSH)

*Cardiac Rehabilitation; *Patient Compliance; Exercise Therapy [*organization & administration]; Home Care Services; Osteoarthritis [rehabilitation]; Physical Fitness; Pulmonary Disease, Chronic Obstructive [*rehabilitation]; Randomized Controlled Trials as Topic

MeSH check words

Aged; Humans; Middle Aged